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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,533	01/27/2004	Richard Lee Fink	12179-P103C1	1026

7590 04/07/2005
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EXAMINER

HUGHES, JAMES P

ART UNIT	PAPER NUMBER
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2883

DATE MAILED: 04/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/765,533

Applicant(s)

FINK ET AL.

Examiner

James P. Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 011005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 13 and 18 are objected to as being unclear. The term “graphite diamond” are unclear in light of the specification. Diamond, Graphite, and an Amorphous structure are all distinct crystal structures (or lack thereof) of Carbon. While it is possible that more than one crystal structure may exist in a given sample, the plain meanings of the terms are unclear. Appropriate action is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 11 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The original specification does not teach the cold cathode comprising amorphous diamond; following, as described above it is unclear what constitutes amorphous diamond.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by Rangwalla et al. (6,426,507). Rangwalla et al. (6,426,507), herein after referred to as “Rangwalla”, teaches a method of operating and corresponding electron beam source comprising a substantially flat cold cathode (112), in an evacuated envelope (114), which emits electrons after a potential difference of at least 110,000 Volts is applied between the cathode (112) and a window support structure (140) by circuitry (e.g., 200). The window support structure (140) supports an electron beam transparent window (142) in the evaluated vacuum envelope, which allows the electron beam to pass out of said envelope and irradiate an object (10).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10-13 and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rangwalla et al. (6,426,507) in view of Zettl et al. (6,057,637).

Rangwalla teaches a method of operating and corresponding electron beam source as

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discussed above; however Rangwalla does not explicitly teach that the cold cathode comprises carbon nanotubes, amorphous diamond emitters, graphite diamond, or fullerene-type carbon materials.

Zetl et al. (6,057,637), herein afterward referred to as "Zetl" teaches a method and corresponding electron source apparatus comprising a substantially flat cold cathode (emission electron) source employing nanotubes (e.g., a fullerene-type carbon material). (see e.g., Fig. 6) Zetl teaches that nanotubes are advantageous for cold cathode emission sources because they have stable and reproducible current-voltage characteristics. (see e.g., Col, 2, ll. 1-5) Additionally, Zetl teaches that amorphous and graphite carbon are byproducts of nanotube manufacturing processes (Col. 3, ll. 55-65) and that nanotubes may behave like thin films of diamond (see e.g., Col. 4, ll. 35-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a plurality of carbon nanotubes, graphite diamond, amorphous diamond, or a mixture of these materials with amorphous carbon (resulting from the nanotube manufacturing process); and one would have been motivated to do so because as Zetl teaches, carbon nanotubes are capable of providing a reliable, nonfragile, and robust cold cathode (field emission) electron sources (See e.g., Col. 1, ll. 65-68).

5. Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rangwalla et al. (6,426,507) in view of Goth et al. (2002/0006489). Rangwalla teaches a method of operating and corresponding electron beam source as discussed above; however Rangwalla does not explicitly teach the vacuum envelope constructed from a five-sided structure. While Rangwalla teaches a circular envelope, five-sided field

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emission structures are commonly employed in the art. For example, Goth et al. (2002/0006489) teaches such a five sided vacuum envelope for supporting substantially flat nanotube cold cathode (field emission) electron sources.

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ an envelope structure with five walls, as commonly employed in the art; and one would have been motivated to do so because this would provide a stable structure for the field emission device.

Conclusion

6. Choi et al. (6,504,292) teaches a nanotube based cold cathode electron emitter. Xu et al. (5,973,444) teaches a carbon fiber based field emission device. Ruy et al. (2004/0195950) teaches a field emission device wherein a carbon nanotube anode, emits electrons through a window. (See e.g., Fig. 2) Nakamoto (6,664,727 and 6,097,138) teach cold cathode field emission devices. Yaniv et al. (2004/0227447) has a common inventor as the instant application and teaches a nanotube based field emission device. Jin (2004/0036398) teaches a MEMS-based cold cathode e-beam device.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 571-272-2474. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James P. Hughes
Patent Examiner
Art Unit 2883



NIKITA WELLS
PRIMARY EXAMINER

04/04/05